Problem # 1

The current in a 50μH inductor is known to be

$$i_L = 18te^{-10t}\text{A for } t > 0.$$

a) Find the voltage across the inductor for $t > 0$. (Assume the passive sign convention.)

b) Find the power (in microwatts) at the terminals of the inductor when t = 200 ms.

c) Is the inductor absorbing or delivering power at 200 ms?

d) Find the energy (in microjoules) stored in the inductor at 200 ms.

e) Find the maximum energy (in microjoules) stored in the inductor and the time (in milli-seconds) when it occurs.

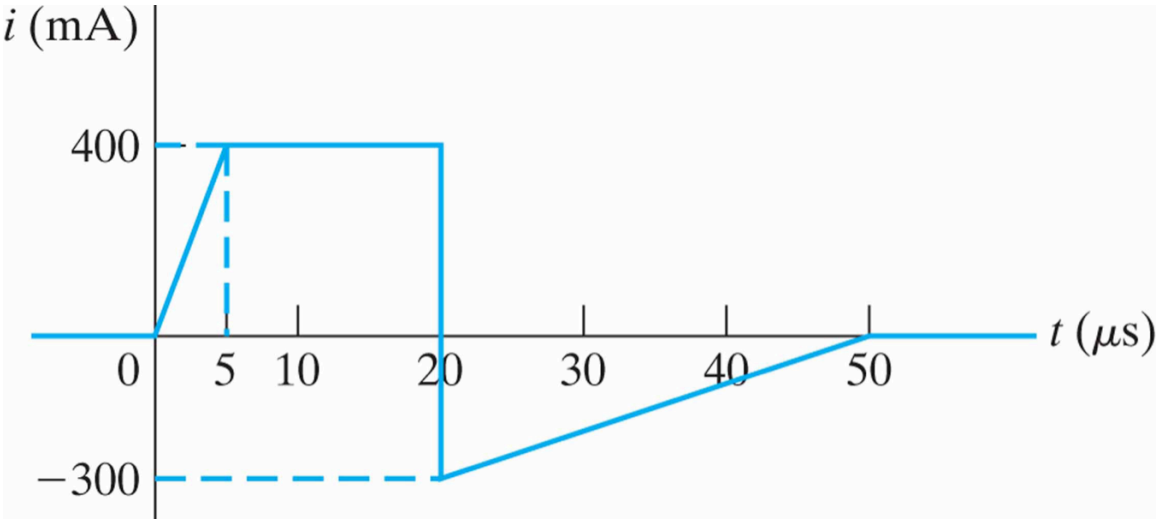
Problem #2

The current is applied to a 0.25μF capacitor. The initial voltage on the capacitor is zero.

a) Find the charge on the capacitor at t = 15μs.

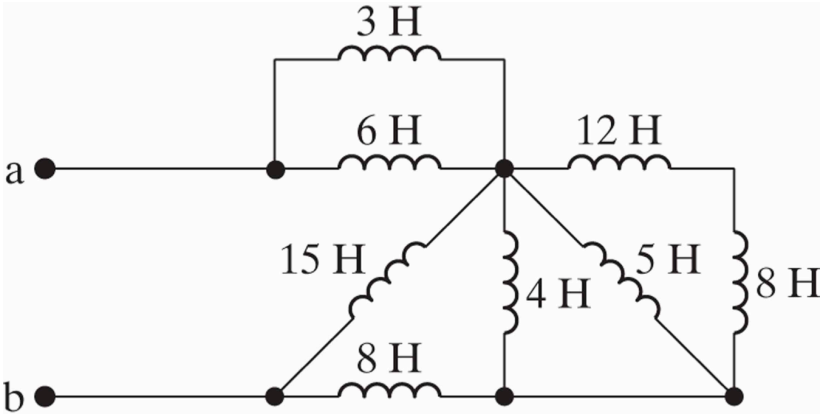
b) Find the voltage on the capacitor at t = 30μs.

c) How much energy is stored in the capacitor by this current?



Problem #3

Assume that the initial energy stored in the inductors is zero. Find the equivalent inductance with respect to the terminals a, b.



Problem #4

Find the equivalent capacitance with respect to the terminals a, b.